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AUTHOR Ross, Steven M.; And Others
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ABSTRACT

The purpose of the Apple Classroom of Tomorrow (ACOT) is to establish a saturated computer environment both to supplement conventional instruction with computer-based instruction and to teach applicants skills to facilitate performance of school tasks. Seemingly, the most powerful intervention is the pairing of each student with a personal tutor. The tutor leaves assignments and writes messages and feedback over an electronic Bulletin Board System (BBS) accessed by modem. This study, which focused on the BBS tutoring component, involved 120 fifth- and sixth-grade ACOT students and their parents, teachers, and tutors, who typically had little or no computer experience. Volunteer tutors were solicited from the Master of Arts in Teaching Program at Memphis State University, and the host system was a 512 Macintosh with a 20 megabyte hard drive disk and an Apple Personal Modem. The research orientation included formative evaluation of instructional materials and methods to determine how they were working and to identify any needed refinements; and summative evaluation to examine end-of-year outcomes on a variety of performance and affective variables. The findings revealed that the performance of ACOT students was superior to that of controls on standardized achievement tests in reading and math, as well as in certain aspects of writing; girls used the BBS more than boys; most students developed considerable proficiency at keyboarding over the school year; and tutors generally regarded their activities as beneficial to them personally and to the tutees. Future studies will, however, monitor standardized test performance more closely. (12 references) (CGD)

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Authors:

Steven M. Ross
Lana Smith
Gary R. Morrison
Ann Ericson
Gloria Kitabchi

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The Apple Classroom of Tomorrow Program

with At-Risk Students

Steven M. Ross
Foundations of Education
Memphis State University
Memphis, TN 38152

Lana Smith
Curriculum & Instruction
Memphis State University
Memphis, TN 38152

Gary R. Morrison
Curriculum & Instruction
Memphis State University
Memphis, TN 38152

Ann Ericson
Microcomputer Services
Memphis City Schools
Memphis, TN 38112

Gloria Kitabchi
Research Services
Memphis City Schools
Memphis, TN 38112

The Apple Classroom of Tomorrow Program with At-Risk Students

A growing number of our nation's students are considered academically at risk. The precipitating circumstances vary from individual to individual, but in a multitude of cases it is a combination of disadvantaged backgrounds and limited resources at home and often at school. Encouragingly, through the design and application of specialized programs such as continuous progress learning, individualized instruction, and cooperative learning, considerable progress is being made in improving the academic performance of these children (Slavin 1988). Offering further hope is the still untapped potential of instructional technology to make powerful educational interventions available to supplement conventional instruction. Such a program, called the Apple Classroom of Tomorrow (ACOT), is the focus of the present study.

The research context is an inner-city elementary school with an enrollment of 900 students, nearly all of whom are black. For these at-risk students, failure and drop-out rates far exceed state and national norms. The purpose of ACOT is to establish a saturated computer environment both to supplement conventional instruction with CBI and to teach applications skills (such as word-processing) to facilitate performance of school tasks. The rationale is that, through successful participation, students will acquire increased motivation, self-confidence, and competence in basic skills and independent learning. Although the program has many different components (CBI, Logo training, software applications), of particular interest to the present research was the use of telecommunications to make one-to-one tutoring of the children by college students both cost-effective and practical.

The ACOT program was initiated in the fall of the 1986-87 school year through a grant from Apple Computer to equip classrooms with microcomputers at the fifth- and sixth-grade levels. Importantly, uses of these computer resources were designed to support specific instructional strategies identified as having high potential to benefit the student population concerned. Specific components are:

(1) Each student and teacher receives a computer to use at school and another to use at home, thus allowing for virtually unlimited computer access for working with CBI programs and practicing applications skills.

(2) Training in basic skills and in using tool software is emphasized.

(3) Parents are integrally involved by being required to attend training sessions and set up the home computer systems. They are also encouraged to work with their children in completing ACOT homework assignments.

(4) Seemingly the most powerful intervention is the assignment, to each student, of a personal tutor who is an education major at a local university. The tutor leaves assignments and writes messages and feedback over an electronic Bulletin Board System (BBS) accessed by modem. This type of application extends existing telephone tutoring strategies, "homework hotlines," and distance learning programs (Butler & Jobe, 1987; Davis 1987; Pedley, 1987; Wood, 1986; Zeller, 1987) by (a) fostering close and long-term relationships between tutors and tutees, (b) maintaining messages and feedback for long-term review, and (c) embedding instructional communications within an

integrated academic program created and delivered through a partnership between teachers, tutors, parents, and university faculty.

Although this computer-saturated program has considerable face appeal, its effectiveness cannot be assumed on that basis alone. Any immediate benefits may be largely attributable to the high levels of individualized attention provided and the newness of the CBI and the BBS resources. Accordingly, extensive and long-term evaluations have been planned to determine participants' activities and attitudes, the program's methodological strengths and limitations, and the influences of component instructional strategies. Studies completed this past year have focused on the BBS tutoring component. This research will be the focus of the present paper.

Program Methodology

Recruitment

In considering needs for tutors, it was decided that college education majors would be ideal candidates given their interest and experiences in teaching. Volunteers were solicited from the Master's of Arts in Teaching Program (MAT) at Memphis State University. This particular group had several compelling reasons for volunteering. One was to learn from firsthand experiences about computers and their uses in schools. Another was to broaden their teacher training by working with the at-risk minority students in the ACOT classroom. A third was to obtain a home computer that they could use for personal work during the school year. A fourth was the opportunity to conduct their Master's thesis studies on one of numerous ACOT-related topics. With these built-in incentives, it was not surprising that we had more volunteers than space could accommodate. The final group of 10 tutors consisted of four males (one minority) and six females, ranging in age from 23 to 47. Their teaching concentrations included science, English, foreign language, social studies, and music.

The BBS System

The host system was a 512 Macintosh with a 20 megabyte hard disk drive and an Apple Personal Modem. One dedicated phone line was used for all incoming calls. The BBS software was Red Ryder Host. Sudents and tutors accessed the BBS using an Apple IIc computer, an Apple Personal Modem, and Apple Access II software. Once on-line, they entered their special code name and were then acknowledged by the system. Next, any messages that had been sent to them since their last access were listed by sender's name and message number. They could then select between menu options allowing them to read, post, or delete messages. The system operator preset a clearance time limit for each group of users. Students and tutors primarily communicated over a "public" bulletin board that anyone could view, but they could also access an electronic mail section to send private messages. In posting a message, the user entered the recipient's name and a brief message title. After typing the message, he/she could choose to send it as it appeared, edit it, or delete it. File transfer was not easily accomplished and therefore was not used.

The Tutoring Model

The tutoring project was initiated by conducting several orientation and training sessions for students, their parents, and tutors. The sessions gave basic demonstrations of how to connect and operate the computer equipment.

Although participants typically had little or no computer experience, they appeared to encounter little difficulty in learning these skills. A second part of the training dealt with the procedures for using the BBS.

Tutoring assignments during the year were primarily activities designed to develop writing skills. One assignment was for the student to write a friendly letter using a format taught in class. The tutor read the letter on the BBS and responded with suggestions about improvements, which the tutor attempted to incorporate in the next draft. This type of interaction was repeated until the tutor was satisfied that the letter met the teacher's criteria. The tutees were graded by the teacher based on the quality of the work and degree of BBS use. Next, the tutors wrote a letter conveying purposeful mistakes to the student. The student's task was to read the letter and identify the mistakes.

A second kind of assignment was used to help students expand their reading and writing vocabulary. Each student constructed an AppleWorks data base containing four categories of information: new words, context sentence, definition, and original sentence. Tutors used the data base to develop learning exercises incorporating those words. In addition to these and other formal assignments, tutors and students were encouraged to use the BBS to share everyday experiences and keep in regular contact with one another.

Research Methods and Findings

Participant groups in the research consisted of 120 fifth- and sixth-grade ACOT students and their parents, teachers, and tutors. Control groups were comprised of approximately equal numbers of children attending matched conventional classes at the same school. The research orientation included formative evaluation of instructional materials and methods to determine how they were working and to identify any needed refinements; and summative evaluation to examine end-of-year outcomes on a variety of performance and affective variables. Some of the studies were time-series designs involving the ACOT group only, whereas others were quasi-experimental comparisons between ACOT and control classes.

The focus of completed research studies include the following: (I) ACOT pre-post gains and outcomes on standardized achievement (CAT) tests, school attendance, and motivation/self-concept measures; (II) the thematic classification of student/tutor messages on the BBS; (III) the influences of BBS activity on keyboarding skills; (IV) modem tutor roles and attitudes; and (V) ACOT activities and the development of writing skills.

A summary of the major findings by study is as follows:

Study I: ACOT students were superior to controls in CAT reading and math performance (Kitabchi, 1987; 1988).

II: (A) Girls used the BBS more than boys, especially for communicating with friends. (B) The BBS was extensively used during the year for exchanging social and academic messages. (C) The quantity and length of messages were not related to students' academic achievement (Ulrich, 1988).

III: (A) Most students developed considerable proficiency at keyboarding over the school year. (B) Keyboarding skill was not related to amount

of BBS use or to academic achievement. (C) Teachers reacted positively to students' keyboarding accomplishments, but were frustrated by the lack of a systematic model for teaching those skills (Hester,-1988).

IV: (A) Tutors generally regarded their activities as beneficial to them personally and to the tutees. (B) They felt that a mentoring relationship in which they tutored and encouraged students was more effective than one in which they evaluated students by grading their work. (C) They were frequently frustrated by the difficulty of accessing the BBS due to its single-line connect capability, and by the absence of clearly specificed tutoring guidelines or assignments (Parry, 1988).

V: (A) Writing skills, evaluated through a systematic analysis scheme, were higher on several dimensions (clarity, organization, grammar) for ACOT students than for the control group. (B) ACOT students generally wrote more concise and better organized essays than the controls. (C) Most ACOT students preferred to write using a computer rather than paper and pencil (Woodson, 1988).

Discussion

Although the higher standardized test performances of the ACOT group relative to the control classes are suggestive of positive program effects, these results need to be viewed cautiously. Because ACOT provided numerous and complex interventions, including special attention from the school system and community, it becomes impossible to isolate its effective attributes or distinguish them from Hawthorne-type effects. However, given this promising preliminary evidence, standardized test performance will be closely monitored in future studies. Also, a study to be initiated in the Fall, 1988 will follow-up ACOT grauates as they attend conventional seventh-grade classes at other schools.

Presently, more meaningful evaluation outcomes relate to participants' program activities and the competencies and attitudes acquired in the process. Overall findings clearly supported the viability of the program rationale, particularly the components of intensive computer training and one-to-one tutoring support using telecommunications. Importantly, the children made extensive use of the BBS and computer-based instruction for learning, while becoming skilled users of many tool applications. An especially important educational aspect of the BBS component was the requirement for communicating exclusively through reading and writing. Thus, a student population overrepresented by poor and reluctant readers and writers were directly practicing these skills while conversing on a regular basis with friends and tutors. Despite these positive aspects of ACOT, several major limitations were noted, including (a) the absence of a clear tutoring curriculum or methodology, (b) restricted access to the BBS due to the availability of only a single-line connection, (c) lack of participaton by some children in the ACOT class, (d) the failure to involve parents on a continuous or systematic basis during the school year, and (e) absence of a program-oriented instructional model for teachers.

The new Apple-Link Personal Edition is being used in the 1988-1989 program to create a more powerful and flexible BBS. A major advantage is multiple user access using Telenet or Tymnet dial-up networks. Others are capabilities for real-time interactive responding, uploading and downloading of assignments and

feedback, and privacy in tutor-student communications. BBS "chat rooms," which allow up to 23 people to converse in real time, will be regularly used to hold group tutoring sessions. Also, while on-line, students will be able to "meet" other Apple-Link users from all over the country, "attend" forums on computer topics, and access numerous information sources (encyclopedia, weather, news, etc.). Tutoring assignments are also being more carefully planned to achieve a better fit with the curriculum and the distance learning environment. Increased efforts to involve parents and arrange more face-to-face contacts between tutors and students during the school year should build a greater sense of community and stronger relationships among participants.

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